4.0 INTRODUCTION:

Current interest in transition metal clusters and colloids in nanometer size range is driven by fundamental and practical means. Particles in the range of 1-50nm have been predicted to have unusual electronic properties which may lead to new technologies based on advanced materials. e.g. Quantum dots in the miniaturization of electronic devices. Furthermore some of these particles have already been shown to have novel catalytic properties and more applications in the area of catalysis. The preparation of these materials is generally based on the reduction of transition metal salts by a variety of reducing agents such as hydrogen, hydrazine, formaldehyde, ethanol or boron hydrides. To prevent undesired agglomeration with formation of either large metal particle in the range of micrometer or metal powders, stabilizers such as special ligands, polymers or tetra alkyl ammonium salts generally need to be used.

Nanotechnology involves the tailoring of materials at atomic level to attain unique properties which can be suitably manipulated for the desired applications [1]. Most of the natural process also takes place in the nanometer scale region. Therefore a confluence of nanotechnology and biology can address several biomedical problems and can revolutionize the field of health and medicine [2,3]. Nanotechnology is currently employed as a tool to explore the darkest avenues of medical sciences in several ways like imaging [4], sensing [5], targeted drug delivery [6], gene delivery systems [7] and artificial implants [8]. Hence nanosized organic and inorganic particles are finding increasing attention in medical applications [9], due to their amenability to biological functionalization. Based on enhanced effectiveness, the new drugs of nanoparticles are of polymers, metals or ceramics which can combat conditions like cancer [10] and fight human pathogens like bacteria [11-13]. In order to facilitate the nanoparticles loading and reduce health risks, nanoparticles in
inorganic matrix are being studied as antibacterial agents. Bactericidal property of these nanoparticles depend on their stability in the growth medium, since this imparts greater retention time for bacterium nanoparticles interaction. There lies a strong challenge in preparing nanoparticles of metal oxide stable enough to significantly restrict bacterial growth.

The bacterial effectiveness of metal nanoparticles has been suggested to be due to both their size and high surface-to-volume ratio. Such characteristics should allow them to interact closely with bacterial membranes rather than the effect being solely due to the release of metal ions [14].

In the present work we have prepared tetra-alkyl ammonium salt stabilized copper, silver and molybdenum (oxide) monometallic nanoparticles separately by Reetz [15] and studied their antimicrobial activities against gram positive and gram negative human pathogens.